AIR MINISTRY.

DIRECTORATE OF CIVIL AVIATION.

ANNUAL REPORT ON THE PROGRESS OF CIVIL AVIATION.

(April 1st, 1922—March 31st, 1923.)

Presented to Parliament by Command of His Majesty.

LONDON:
PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased through any Bookseller or directly from
H.M. STATIONERY OFFICE at the following addresses:
IMPERIAL HOUSE, KINGSWAY, LONDON, W.C.2, and 28, ABINGDON STREET, LONDON, S.W.1;
YORK STREET, MANCHESTER; 1, ST. ANDREW'S CRESCENT, CARDIFF;
or 120, GEORGE STREET, EDINBURGH.

1923.

Price 9d. Net.

f.d.
629.13
Gr786pc
1922/23

f d.
629
Gr786pc
192

SUMMARY OF CONTENTS.

PAGE
INTRODUCTION - - - - - - - - - - - 3

PART I.—GENERAL AND BRITISH EMPIRE:
Relations with Foreign Countries - - - - - - - 4
Civil Aviation Advisory Board - - - - - - - 5
Civil Air Transport Subsidies Committee - - - - 6
Commercial Air Services - - - - - - - - - 6
Training of Reserve Officers - - - - - - - - 10
Air Navigation Regulations - - - - - - - - 11
Licences and Certificates - - - - - - - - 11
Estimates - - - - - - - - - - 11
Air Conference - - - - - - - - - 12
Ground Organisation:
Air Ports and Landing Grounds - - - - - 12
Navigation - - - - - - - - - - 13
Wireless Communications - - - - - - 15
Meteorology - - - - - - - - - 15
Aeronautical Maps - - - - - - - - 16
Technical Services - - - - - - - - - - 18
Medical Services - - - - - - - - - - 20
The Dominions, India and the Colonies - - - - - - 21

TABLES:
A. British Civil Aviation - - - - - - - - 26
B. Aircraft Flights and Passengers carried between Great Britain and the Continent - - - - - - - 27
C. Value of goods imported and exported by Aircraft - - 28
D. Efficiency of British Air Transport Services - - - 29
E. Causes of landings *en route* for other than traffic requirements - - - - - - - - - - - 30
F. Accidents: Civil Aviation - - - - - - - - 31

PART II.—FOREIGN COUNTRIES:
General Remarks - - - - - - - - - - 32
Europe:
Belgium - - - - - - - - - - 32
France - - - - - - - - - - - 33
Germany - - - - - - - - - - 35
Holland - - - - - - - - - - 36
Italy - - - - - - - - - - - 36
Spain - - - - - - - - - - - 37
Scandinavian States - - - - - - - - 37
East European States - - - - - - - - 38
America:
South American States - - - - - - - 38
United States - - - - - - - - - 40
Asia:
Siam - - - - - - - - - - - 40

INTRODUCTION.

In the interests of economy it has been decided to substitute an Annual Report on the Progress of Civil Aviation in place of Reports at half-yearly intervals, the last of which (the sixth of the series*) covered the period October 1st, 1921—March 31st, 1922.

Accordingly, the present Report covers the year April 1st, 1922—March 31st, 1923.

It is compiled on the same general lines as the half-yearly Reports, and continues and supplements the account of developments in Civil Aviation contained therein.

Part I. relates to Great Britain and the Empire and Part II. to foreign countries.

---

* "Synopsis of Progress of Work in the Department of Civil Aviation, 1st May, 1919, to 31st October, 1919" (Cmd. 418, H.M. Stationery Office, 2*d.*); "Synopsis of Progress of Civil Aviation in Foreign Countries, up to 31st October, 1919" (Cmd. 476, H.M. Stationery Office, 1*d.*); "Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1919, to 31st March, 1920" (Cmd. 800, H.M. Stationery Office, 3*d.*); "Half-Yearly Report on the Progress of Civil Aviation, 1st April, 1920, to 30th September, 1920" (Cmd. 1073, H.M. Stationery Office, 4*d.*); "Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1920 to 31st March, 1921" (Cmd. 1342, H.M. Stationery Office, 6*d.*); "Half-Yearly Report on the Progress of Civil Aviation, 1st April, 1921, to 30th September, 1921" (Cmd. 1559, H.M. Stationery Office, 3*s.*); and "Half-Yearly Report on the Progress of Civil Aviation, 1st October, 1921, to 31st March, 1922" (Cmd. 1710, H.M. Stationery Office, 6*d.*).

m (5)20192 Wt 5291--8737 (P.F. 511) 1250 7/23

PART I.—GENERAL AND BRITISH EMPIRE.

RELATIONS WITH FOREIGN COUNTRIES.

International Commission for Air Navigation.

The International Commission, provided for by Article 34 of the Convention for the Regulation of Aerial Navigation, held its first meeting on 11th July, 1922, in Paris, at the Ministry of Foreign Affairs, under the Presidency of M. Poincaré.

On this date the Convention came into force by reason of the deposit of ratifications on 1st June by the following signatory States :—British Empire, Belgium, Bolivia, France, Greece, Japan, Portugal, Kingdom of Serbs, Croats and Slovenes, Siam. Persia has also adhered to the Convention, and Italy deposited her ratification on 13th March, 1923.

The Commission proceeded to draw up its rules with regard to its procedure and appointed the following Sub-Commissions :—Operational and Materials, Wireless, Meteorological, Medical, Legal and Maps ; and arranged to hold sessions three times a year in June, October and February. Accordingly, the second session was held in London on 25th–27th October, and the third session in Brussels on 28th February–2nd March, 1923.

The meetings have been noticeable for the marked cordiality that has existed between the representatives of the several States and the progress that has already been made in the discussion of amendments to the Annexes of the Convention and in the drawing up of the regulations required by the Convention itself.

The Dominions and India have requested that the representative of Great Britain should, for the present, also represent their interests at the meetings of the Commission. At the first session, Lord Gorell, then Under-Secretary of State for Air, represented Great Britain. Later, Major-General Sir W. Sefton Brancker was appointed permanent representative of this country and became a member of the Co-ordinating Committee of the Commission and Chairman of the Operational and Materials Sub-Commission, which necessarily to a large extent focuses the operations of the other Sub-Commissions.

One of the most important amendments drawn up by the I.C.A.N. is the Protocol for the amendment of Article 5 of the Convention, to enable the contracting States to enter into a special convention for international air transport with a State which is not a party to the Convention, provided that the terms of the agreement do not infringe the rights of the contracting parties to the present Convention and conform to its regulations. This Protocol has been accepted by Great Britain, India and the Dominions, Belgium, France and Portugal and only awaits acceptance by the other contracting States and ratification before it becomes part of the Convention.

The amendment of the system of voting laid down in Article 34 of the Convention is under consideration by the Commission. The Commission is also, *inter alia*, proceeding to draw up the standard minimum requirements for the issue of certificates of airworthiness and to examine the whole question of log books required to be kept or to be carried on board aircraft; it has already drawn up the regulations for the carriage of wireless and has amended the regulation as to signals contained in Annex D of the Convention.

Temporary Agreements with Foreign Powers.

As a result of representations made to the Governments of Norway and Sweden suggesting the extension of the Customs facilities for aircraft provided in the temporary air traffic agreements with these countries, a supplementary agreement to the effect desired was entered into with Norway on 22nd February, 1923, and additional facilities have been offered by Sweden.

Negotiations are in progress with the Governments of Holland and Spain with a view to making an air traffic agreement with each of these States, and, in order to permit the operation of air services between London and Berlin and London and Prague, preliminary negotiations have been opened with Germany and Czecho-Slovakia. The conclusion of the agreement with Germany will be subject to the amendment of Article 5 of the Convention.

CIVIL AVIATION ADVISORY BOARD.

The Civil Aviation Advisory Board, under the chairmanship of the Under-Secretary of State for Air, which was appointed by Capt. The Rt. Hon. F. E. Guest to "advise generally on the development of civil aviation and to report upon any specific point which may, from time to time, be referred to the Board by the Secretary of State for Air," presented its first report* in July, 1922, on the question of "the cost and practicability of an Imperial Air Mail Service." This report recommended that a technical and scientific investigation should be instituted to ascertain the most suitable type or types of aircraft and engines for a service to India and the most economic length of the stages, that at the same time the route from Baghdad to Karachi should be laid out and prepared for operation by civil machines, that the route from Cairo to Baghdad now operated by the R.A.F. should also be prepared for the same purpose and that tenders should be invited and Government financial assistance should be given to the company whose tender was accepted on the lines set out in the report.

---

* Cmd. 1739; His Majesty's Stationery Office, 1922; 1*s*. net.

The Board also presented a report[*] to Sir Samuel Hoare, Secretary of State for Air, in February, 1923, on the "Aerodrome facilities of London," which recommended that the Croydon aerodrome should be retained as the London Terminal Aerodrome and should be enlarged and improved at a total sum not exceeding £250,000.

CIVIL AIR TRANSPORT SUBSIDIES COMMITTEE.

The Secretary of State appointed a small Committee of financial experts, with Sir Herbert Hambling as Chairman, to "consider the present working of the scheme of cross-Channel subsidies, and to advise on the best method of subsidising air transport in future."

This Committee reported[†] in February, 1923, that after very full consideration of the whole problem they were forced to the conclusion that the creation of a new commercial organisation run entirely on business lines with a privileged position with regard to air transport subsidies was the best solution. They recommended that a company with a capital of £1,000,000 (of which at first £500,000 should be subscribed) should be guaranteed by the Government a subsidy of not less than £1,000,000 (spread over a period of ten years, but not in equal annual instalments); that the Government should have the right to nominate some of the directors, but that otherwise the company should not be subject to Government control except for the purpose of such checking as may be necessary to determine the amount of subsidy payable and for the necessary control by the Civil Aviation Department over all civil flying in the country; and that after the payment of a cumulative dividend of 10 per cent. on the ordinary shares of the company the balance of profits in any year should be divided equally between the shareholders and the Government, so that when the Government shall have received back the amount of subsidy, without interest, the Government interest in the company should cease and the whole profits should belong to the shareholders of the company.

COMMERCIAL AIR SERVICES.

Subsidised Services.

The agreements providing for the operation of the London–Paris route by Handley Page Transport, Ltd., Instone Air Line, Ltd., and Daimler Hire, Ltd., came into force on 1st April, 1922, while the service to Brussels operated by the Instone Air Line, Ltd., was inaugurated on 8th May, 1922.

The immediate results were a very considerable increase in the number of services to Paris, and a considerable increase in the traffic carried. After a few months, however, it became apparent that the traffic anticipations upon which the subsidy conditions had been based were not being realised and that the competition between the three British firms operating services on the route was resulting in considerable financial loss.

---

[*] Cmd. 1816; H.M. Stationery Office, 1923; 3*d.* net.

[†] Cmd. 1811; H.M. Stationery Office, 1923; 6*d.* net.

The conditions of the subsidy were accordingly revised. Compensation in respect of losses incurred during the period April–June, 1922, was arranged and the revised scheme was drawn up based on the following principles :—

(i) The elimination of competition amongst the State supported services.

(ii) The extension of British transport activities as far into Europe as possible with the money available and the establishment of at least one internal air route in Great Britain.

Under this scheme, which was brought into operation on 1st October, 1922, the following became approved services for the period 1st October, 1922–31st March, 1924.

Firm.	Service.	Annual minimum services in each direction.	Annual minimum total mileage.	Annual maximum subsidy.
				£
Handley-Page Transport, Ltd.	London–Paris	300	—	15,000
Instone Air Line, Ltd.	London–Brussels–Cologne.	300	—	25,000
Daimler Hire, Ltd.	Manchester–London–Amsterdam–Hamburg–Berlin.	—	253,846	55,000
British Marine Air Navigation Co., Ltd.	Southampton–{Cherbourg, Havre, and Channel Islands,	—	60,000	10,000

In addition a grant of material, previously leased on hire-purchase terms, was made to the three former firms, each firm receiving aircraft and engines to a value of approximately £28,500, together with an undertaking that, within a maximum of £15,000 to each firm, 30 per cent. of the cost of purchases of complete aircraft and engines made by these firms would be contributed during the financial year 1923–1924. The British Marine Air Navigation Co., Ltd., to whom no initial grant of equipment was made, received an undertaking that, within a maximum of £21,000, 50 per cent. of the cost of such purchases would be contributed prior to 31st March, 1924.

International difficulties which arose in the case of the Cologne route were adjusted from the commencement of the service in October, but those in regard to flight into unoccupied Germany prevented the extension of the Daimler Hire, Ltd., service beyond Amsterdam during the year under review.

The marine aircraft services approved for operation by the British Marine Air Navigation Co., Ltd., will not come into operation before August, 1923. It is expected that these services will provide valuable experience and data, hitherto lacking, in the operation of oversea services.

Airships.

The airship material owned by the Government has been retained in the custody of care and maintenance parties pending the Cabinet decision on the future policy with regard to the operation of lighter-than-aircraft.

Miscellaneous Services.

An increased use is being made of air taxi machines, and during the year the De Havilland Aeroplane Hire Service flew over 100,000 miles on work of this nature. The increase in demand for this service has resulted in reduction of hire rates to 2*s.* a mile for a 3-passenger machine.

During the year under review, the first public demonstrations of sky writing for advertisement purposes took place. Research and experimental work in this direction had been carried out by Major J. C. Savage since 1913. By the end of the year, the Savage Sky Writing Co., which owned and operated a fleet of 18 single-seater machines and gave employment to 16 pilots, had carried out operations in Great Britain, France and America,

Extended use of aerial survey for commercial purposes has been made during the year, and in addition to work of this nature which has been carried out in the Dominions, where opportunities are greater, aerial surveys have been carried out by Aerofilms, Ltd., in connection with the Electric Railway extension to Edgware, the construction of the new London–Southend arterial road and the erection of hydro-electric plant at Loch Neagh (N. Ireland); and by Airco Aerials, Ltd., in connection with housing schemes in various parts of the country. The Central Aerophoto Co., Ltd., have devoted attention to aerial photography of a more general character, their work including views of estates and factories offered for sale, etc.

Summary of Civil Flying.

Although the increase in traffic on the London–Paris air route in the Summer of 1922 failed to attain the dimensions expected, there was nevertheless a considerable increase in the total air traffic during the year under review as compared with the previous year.

Statistics of the work accomplished are given in the Tables A. to F on pages 26–31.

Table A (page 26) shows that air transport flights (internal and continental) numbered 4,000, in the course of which 11,460 passengers and 216·4 tons of goods were carried, while in the previous year the corresponding figures were 1,156 flights, 5,692 passengers and 26·6 tons of goods. A larger proportion of the total British flying consisted of air transport, as distinct from joy riding, than in the previous year.

From Table B (page 27) it will be seen that British aircraft gained a larger share of the cross-Channel air traffic than in the previous year. Out of a total of 5,137 flights and 13,172 passengers, 2,965 flights were made and 10,066 passengers were carried by British aircraft, representing percentages of 57·7 and 76·4 respectively, whereas for the year ending March 1922 the corresponding percentages were 33·1 and 51·5.

Since the opening of air transport to the Continent (August, 1919) up to the end of March 1923, the total number of passengers carried by machines of all nationalities flying on the cross-Channel air routes amounted to 32,189, and the best month during this period was August, 1922, when 2,682 passengers were carried.

The efficiency of the British services has steadily increased. Table D (page 29) illustrates this improvement in the case of the London–Paris service. Whereas in the year ending September 1920 the efficiency was 85 per cent., in the following year it rose to 89 per cent., and in the year ending September, 1922, to 92 per cent. The second part of the same table, dealing with the six months following the re-organisation of the services in October last year, indicates that, although two of these services were operating over new routes and winter conditions had set in, the average efficiency was maintained at 83 per cent.

An analysis of the causes of landings *en route* is given in Table E (page 30). It is shown that of the flights which occurred during the nine months July, 1922–March, 1923, 15 per cent. were interrupted by stoppages, many, however, of short duration. Of these stoppages 44·7 per cent. were due to bad weather and only 12·7 per cent. were caused by engine or installation failures. Stops for replenishing fuel, in many instances pre-arranged, accounted for 36·6 per cent.

For the second consecutive year no passenger was killed in the course of flights on regular air services. One passenger was, however, slightly injured in a collision on the ground. Accident and casualty rates for civil aviation are given in Table F (page 31).

Operational Experiment in Night Flying.

During February a series of experimental flights on the London–Paris route were carried out by night in order to obtain data in regard to the operation of night services in bad weather. Flying conditions during this period were exceptionally bad, even for the time of year in question, the prevalence of fog and of sky 80 per cent. or more covered by low cloud being twice as great as in the average of past Februarys. Nevertheless, the directions in which further development is desirable in order to overcome the special difficulties of night flying in adverse weather conditions were ascertained and further experiments will be carried out during the coming year, and, in spite of the unfavourable conditions, it was possible to confirm that night flying on the route in the absence of fog and low cloud is as commercially practicable as daylight flying.

TRAINING OF RESERVE OFFICERS.

A scheme has been decided upon for the flying training of the Royal Air Force Reserve of Officers at civil training schools. In general terms the objects of this scheme are, as well as providing an efficient flying training, to stimulate aviation by creating centres of training in various parts of the British Isles in addition to regular Air Force stations, to provide employment for firms connected with civil aviation and to secure training centres that will be so situated as to suit the convenience of the Reserve officers.

Four such schools are being established and approximately 70 pupils will be trained at each school. With a view to distributing the schools over the United Kingdom as far as possible the following centres have been selected :—

London	-	(De Havilland Aircraft Co., Ltd.).
Bristol	-	(Bristol Aeroplane Co., Ltd.).
Coventry	-	(Armstrong Siddeley Motors, Ltd.).
Renfrew	-	(William Beardmore & Co., Ltd.).

The training comprises a course not exceeding 24 days per annum. Normally it should be taken quarterly, but at the discretion of the Air Ministry a course can be taken in one complete period. For those who, on first joining the Reserve, are considerably out of practice in flying a special requalifying course has been extended to a maximum of two months. Both courses include some ground training in maintenance of aircraft.

A Superintendent of Reserve, who is responsible for the flying training, has been appointed. He and his staff of flying instructors will constantly visit the schools, and by personal inspection see that the training is being carried out efficiently and in accordance with the general regulations laid down by the Air Ministry.

Reserve officers will be allocated to schools, as far as possible in accordance with their own wishes as regards time and place, by the Air Ministry, but further details, including the actual periods in which they carry out their flying training, will be arranged between the individual officers and the school concerned, subject, however, to the concurrence of the Superintendent of Reserve.

On completion of the training, officers will be required to satisfy the Superintendent of Reserve as to their efficiency by practical test, and on passing this test the officer will receive a retaining fee and the school a capitation grant for the training carried out.

AIR NAVIGATION REGULATIONS.

As from 11th July 1922, the date of the entry into force in respect of Great Britain of the International Air Convention, the Air Navigation Regulations, 1919, were revoked and replaced by the Air Navigation Order, 1922,* the purpose of which was to give effect to the provisions of the Convention.

At the same time a new edition of the Air Navigation Directions† was substituted for the Directions issued under the 1919 Regulations.

Regulations for the investigation of accidents,‡ in accordance with section 12 of the Act of 1920, were made on 28th June, 1922, and came into operation on 12th July, 1922. These regulations apply to accidents to aircraft which occur in or over the British Islands, or elsewhere to aircraft registered in the British Islands; they provide for the compulsory notification of certain classes of accidents and for the holding of investigations into accidents.

LICENCES AND CERTIFICATES.

The following licences and certificates have been granted during the period under review :—

——	New Licences or Certificates issued during the year.	Renewals during the year.	No. of Licences or Certificates current on 31st March, 1923.
Licences for Pilots - - -	52	205	96
Licences for Ground Engineers	73	192	265
Licences for Aerodromes - -	145	15	30
Certificates of Registration :—			
Heavier-than-Air Craft -	132	98	170
Lighter-than-Air Craft (Balloons)	1	5	6
Certificates of Airworthiness :—			
Heavier-than-Air Craft -	60	51	96
Lighter-than-Air Craft -	—	—	—

ESTIMATES.

The estimates for civil aviation in 1923–24 (Air Estimates, Vote 8) cover a total net sum of 287,000*l*., comprising 205,000*l*. for the subsidisation of civil air transport companies operating approved air services with British machines and engines, 39,000*l*.

---

* S.R. & O. 1922, No. 663; H.M. Stationery Office; 11*d*. net.

† A.N.D. 3 and A.N.D. 4; H.M. Stationery Office; 3*d*. net and 1*d*. net respectively.

‡ S.R. & O. 1922, No. 650; H.M. Stationery Office; 2*d*. net.

for the upkeep of aerodromes, 16,000*l.* for aerial routes, surveys, &c., 7.000*l.* for technical equipment and 28,300*l.* for works and building services at the London Terminal Aerodrome, Croydon, at Lympne, Kidbrooke and Malta, and for the provision of a lighthouse on the London–Manchester route and for lighting on the British portion of the routes to the Continent.

In addition a sum of 20,891*l.* is estimated as the cost of the Headquarters Staff (Vote 5). The estimates for meteorological services (including the Meteorological Office Staff) are not included for 1923–24 in the estimates for civil aviation as was the case in previous years.

Appropriations in aid, including receipts from the housing of machines, landing fees, licences, &c., and from the sale of machines and equipment are estimated to produce 14,000*l.*

AIR CONFERENCE.

The Third Air Conference§ was held at the London Guildhall on 6th and 7th February, 1923. The Conference was preceded on 5th February by a demonstration of civil machines at the London Terminal Aerodrome, Croydon.

The proceedings on the first day of the Conference were opened by the Lord Mayor of London and the Conference was divided into four sessions, under the chairmanship of, respectively :—

Lieut.-Col. the Rt. Hon. Sir Samuel Hoare, Bart., C.M.G., M.P. (Secretary of State for Air).
Sir Henry P. Maybury, K.C.M.G., C.B.
His Grace the Duke of Sutherland (Under Secretary of State for Air); and
Sir William Joynson-Hicks, Bart., M.P.

On the opening day papers were read by Major General Sir Sefton Brancker, K.C.B., A.F.C. (Director of Civil Aviation, Air Ministry), on "The Position of Air Transport To-day," Commander C. Dennis Burney, C.M.G., M.P., on "The Establishment of a Self-Supporting Airship Service," Air Vice-Marshal Sir W. Geoffrey H. Salmond, K.C.M.G., C.B., D.S.O. (Air Member for Supply and Research, Air Ministry), on "The Progress of Research and Experiment," Colonel Alec Ogilvie, C.B.E., F.R.Ae.S., on "Gliders," and Mr. C. R. Fairey, M.B.E., F.R.Ae.S., on "Seaplanes."

The second day of the Conference was devoted to the discussion of the papers read on the previous day.

GROUND ORGANISATION.

Air Ports and Landing Grounds.

The development of Croydon aerodrome has been continued. The surface of the aerodrome has been improved by the removal of a ridge and by the levelling of several minor spots. To facilitate re-fuelling, additional petrol filling points have been installed. Four race meetings, including the Aerial Derby and King's Cup Race, were held under the auspices of the Royal Aero Club during the period under review.

---

§ A report of the proceedings has been published by His Majesty's Stationery Office; Cmd. 1848, 1923; 4*s.* net.

At Lympne aerodrome, a new power station and improved fire-fighting apparatus, including a large water tank, mechanically operated pumps, hydrants and additional mains, have been installed. An area of about 500 ft. by 100 ft. has been levelled to remove a bad depression on the aerodrome and five disused hangars on the southern side of the aerodrome have been demolished, thereby adding considerably to the open space available.

The aerodromes at Manchester (Alexandra Park) and Birmingham (Castle Bromwich) have been put into service in connection with the air line between London and Manchester operated by Daimler Hire, Ltd. As regards the Manchester aerodrome, negotiations are proceeding to obtain a short lease of the ground with a view to its ultimate acquisition, while in the case of the Birmingham aerodrome, the owners of the ground, the Birmingham Tame and Rea District Drainage Board, have kindly given the Air Ministry the free use of the land as an aerodrome for a period of three years.

Renfrew aerodrome (Glasgow) is being retained and negotiations are in hand respecting a lease of the ground.

Navigation.

In order to minimise the risk of collisions occurring between aircraft flying on regular air routes the Belgian, French, and British Governments have supplemented the rules of the air contained in the International Air Convention by new rules designed to keep aircraft at a safe distance from one another when following an officially defined route.

An improved system of traffic control has been introduced at the Croydon aerodrome. A traffic officer is constantly on duty in the control tower during flying hours and is attended by a W/T operator who is in direct conversation with the pilots of all aircraft fitted with radio telephony. By the use of charts of the routes flown over and the necessary navigation instruments, supplemented by reports from the aircraft at fixed points, the traffic officer is able to keep a check on the position of machines at every stage of their journey. The constant practice obtained by this officer in plotting positions is of great value during conditions of low clouds, mist or darkness, in enabling pilots to obtain information regarding their position when they are prevented from observing the ground. Other information is also passed to aircraft in flight, as, for example, warnings regarding weather conditions, or the close proximity of other machines when the visibility is bad. In addition, the operating companies are kept informed of the progress of their machines.

In conjunction with the Acoustical Section of the Royal Engineers, War Office, experiments are in train at Croydon aerodrome with a sound-locating device, by means of which a skilled operator at the aerodrome is able to locate the direction of an approaching machine during weather conditions which render it impossible to see the machine and when the aircraft is at such close range that direction finding by wireless telephony is impracticable.

The equipment of the British section of the continental air route with apparatus necessary to safe night flying has been brought near to completion and, as mentioned earlier in this report, experiments in flying by night between London and Paris under adverse weather conditions were made in February and March.

To facilitate accurate navigation by night a second route-marking light of 250,000 candle power (nominal) has been installed on the route, at Cranbrook, Kent. An illuminated wind indicator intended for installation on emergency landing grounds, has been exhaustively tested at Croydon and finally erected at the landing ground at Penshurst. This indicator informs a pilot of the direction of the wind, both by day and by night, and also assists him to locate the landing ground at night when 3 or 4 miles distant. It requires no attention for periods of six months and will, it is hoped, eventually be so improved as to be visible at about 10–12 miles, and, furthermore, give a pilot the strength of the ground wind as well as its direction.

An experimental strontium-coloured acetylene beacon exhibiting an intense red flame has been installed at Croydon aerodrome with the object of testing the power of this flame to penetrate mist during day and night. The system shows promise and, after further development, should be of considerable assistance to a pilot endeavouring to locate an aerodrome on a misty or rainy night when the ordinary white lights are almost completely obscured by the atmospheric conditions. For lighting the landing area at night a number of devices has been experimented with. Amongst these may be mentioned searchlights of various sizes fitted with both arc lamps and incandescent electric lamps, also various types of "Flood-light" projectors. In addition to the ground equipment used for lighting purposes a considerable amount of experimental and test work has been carried out with apparatus designed for fitting on night-flying aircraft. Navigation lamps, signalling lamps, &c., for use on different types of aircraft have been tested and certain valuable data obtained.

A new form of impulse tube designed to discharge projectiles to a height of about 2,000 feet has been installed at Croydon and Lympne aerodromes. This apparatus simplifies signalling to aircraft and assists pilots to locate the aerodrome both by night and by day. Sundry other forms of pyrotechnic signal have been experimented with and definite information obtained.

The system of marking the names of towns, railway stations and aerodromes in large letters visible to airmen by day has been further extended to meet the increasing needs of cross-country flying. Thirty-one places have been marked in this manner.

Arrangements have been made with the Admiralty whereby the Civil Aviation Traffic Officers at the Lympne and Croydon aerodromes, together with a number of Inspectors of the Aeronautical Inspection Directorate, have been given a course of instruction in the care and adjustment of aircraft compasses at the Admiralty Compass Observatory. The services of these officers are utilised in keeping compasses in machines in good condition and correctly adjusted.

Wireless Communications.

The inauguration of a London–Manchester service has necessitated the re-opening of the wireless stations at the Manchester and Birmingham aerodromes. Similarly, the extension of the London–Brussels air line to Cologne has entailed the erection of a new station at the Bickendorf aerodrome, Cologne, and the establishment in the near future of a flying boat service between Southampton and Havre, or Cherbourg, has rendered necessary the erection of a station on the Island of Guernsey.

A large volume of radio traffic has been carried out at Croydon in connection with the control of the movements of aircraft. A special amplifier circuit has been incorporated in the line switching system between the control tower and the wireless station, and speech between the traffic controller and the pilots of the various aircraft is normally in all respects satisfactory.

A series of tests has been conducted with a view to calibrating the Croydon direction-finding reception station and reducing possible sources of error, a mobile station having been operated in the vicinity of Croydon for this purpose. In the near future it is hoped to conduct a further series of tests with an aircraft.

On the occasion of the around-Britain race for His Majesty's Cup, 1922, a special wireless organisation, including the stations at the existing civil aerodromes, was brought into force for the purpose of reporting the progress of the race.

Reports regarding the reception of the British Synoptic Meteorological messages, which are transmitted from the Air Ministry W/T Station, have been received from most European countries. The reports show that the signals can be successfully intercepted over the whole of Europe and by merchant vessels up to distances of approximately 1,200 miles.

Meteorology.

The general character of the organisation of that part of the Meteorological Office which is connected with civil aviation has changed little, but there have been numerous improvements in detail and a slight general extension.

During the summer months the service of hourly weather reports for the London–Continental routes was made to commence at 3 a.m. G.M.T. and, in connection with night-flying experiments in February, 1923, the service was extended as a temporary arrangement up to 11 p.m. each night.

The commencement of regular air services to Manchester and Cologne necessitated a corresponding extension of the meteorological arrangements. On the London–Manchester route a service of route weather reports was provided as from October, 1922. On the London–Brussels–Cologne route, the weather reporting service was extended by the inclusion of Aachen and Cologne. The reports regarding Aachen are provided by the German Meteorological Service; those for Cologne by the representative of Instone Air Line, Ltd.

The British collective hourly route weather reports issued by W/T at 35 minutes past each hour* now give a last-moment report regarding the conditions at Croydon. In France and Belgium a similar practice has been adopted.

During the last six months, emergency weather reports have been provided in respect of an alternative route along the north Kent coast, on occasions when conditions of visibility and low cloud on the normal route to the Continent fall below a certain specified level. Similarly, in connection with the Manchester route, reports are provided (in this case by the kindness of the De Havilland Aircraft Company) regarding weather at Stag Lane aerodrome, Edgware, when the conditions at Croydon are too bad for machines to land at the latter place.

Experiments have been conducted at Croydon and at the Observatory at Benson with a view to devising a method of determining the height to which a fog extends. A suitable apparatus has now been constructed and will shortly be available for use at Croydon on occasions of fog.

At the Air Ministry, examinations in meteorology for Class B pilots have been conducted; 73 pilots have been examined during the year. In order to assist civil pilots preparing for this examination two courses of lectures were delivered by the Meteorologist-in-Charge at Croydon during August, September and October, 1922.

Aeronautical Maps.

General Aeronautical Series.—The present state of the work on the general aeronautical series is shown below. The scale of this series, which is on Mercator's Projection, is approximately 1 : 3,700,000 at the Equator and 1 : 2,200,000 in the latitude of the British Isles.

---

* For details *see* M.O. 252, pp. 10–12; obtainable, price 2*s*. 6*d*., from H.M. Stationery Office.

British Sheets.

Britain : completed to proof stage.
Balkans : ,, ,,
Egypt : ,, ,,
Iraq : ,, ,,
Oman : ,, ,,
Kordofan : in hand.
Baluchistan : ,,
Yemen : included in programme.
Japan–Vancouver route : 5 sheets, unnamed, in hand.
Italia : skeleton sheet in hand.
Algerie : ,, ,, included in programme.

French Sheets.

Espagne : completed to proof stage.
Belgique : in hand.

The publication of the five British sheets shown as " completed to proof stage " has been delayed pending international agreement on all points. Satisfactory progress has been made in this direction, only one important question remaining unsettled. This question relates to the colour of the hypsometric tints and has been left open. Accordingly, it is proposed to proceed forthwith with the publication of these five sheets, after completion of the work involved in bringing the aeronautical information plates up to date. Together with the sheets "Italia " and " Baluchistan " these sheets will cover the whole of the route from England to India.

With regard to the five sheets of the Japan–Vancouver route, it is expected that proofs of the basic maps will be available in April. The aeronautical information plates of these sheets await the acquisition of certain information; steps are being taken which, it is hoped, will be successful in obtaining this information.

France has completed, but not yet published, the sheet " Espagne " and has the sheet " Belgique " in hand.

Local Aeronautical Series—British Isles.—Sheets 11 and 12 of this series (scale : 4 miles to 1 inch) are " completed to proof stage " : these two sheets cover southern and south-eastern England, south of the line Watford–Cardiff and east of the line Cardiff–Taunton. The aeronautical information on these sheets is being brought up to date, and they will be published shortly. The production of the subsequent sheets of this series will be in the hands of the Ordnance Survey, the series being treated as one of the national series of maps.

Route Maps.—Two experimental route maps are in hand : one on a scale of 4 miles to 1 inch, covering the London–Manchester route ; the other on a scale of 1 : 500,000, covering the London—Paris route. It is expected that proofs of the former route map will be ready shortly.

Surveying from Air Photographs.—Two publications on this subject are likely to appear soon. One is a report of the Air Survey Committee and the other an account of the research carried out at Cambridge under the auspices of the Aeronautical Research Committee. In these two publications will be described the methods which have been found of most utility in the survey proper, in the navigation of the aeroplane so as to give the best results from photography, and in the design and mounting of the cameras employed. Meantime, the Air Survey Committee is ready to give any information in its power. The address is, The Secretary, The Air Survey Committee, Geographical Section, General Staff, War Office, London.

TECHNICAL SERVICES.

Considerable progress has been made in improving designs of civil aircraft by increasing the lifting capacity of aerofoils and thereby increasing the useful load carried and reducing the landing speed.

The factor of safety of civil flying has been raised (*a*) as the result of investigations into various methods of fire prevention, and (*b*) through the elimination of a majority of the causes of engine failure, by re-designing fuel systems and cooling systems.

A considerable amount of work has been done in defining the minimum flying requirements of civil aircraft, more especially in regard to taking off, landing, balance, stability and controllability, and a series of tests has been formulated which will ensure each aircraft being satisfactory in these qualities before a certificate of airworthiness is granted. These requirements tend further to raise the standard of civil aircraft and will probably form the basis of an agreed international standard for western European conditions.

Numerous practical tests of various designs of under-carriages have met with such a measure of success that the resulting designs should ensure greater safety to passengers in the event of a forced landing, and furthermore reduce the risk of damage to the aircraft itself.

Specifications of aeroplanes have been drafted to meet the probable requirements of civil air transport in the near future, particular attention being given to providing a machine capable of flying long distances, as for instance, over desert regions, without intermediate landing. The three-engined type of civil aircraft is to be developed in order to reduce to a minimum the risk of forced landings for ordinary civil air transport.

The three principal routes for which machines are being built are :—

(1) England—France Route (*viâ* Southampton),

for which the following machines are now being constructed :—

Supermarine Twin-Engined Amphibian Boat Seaplane.

This seaplane will be fitted with two Rolls-Royce " Eagle IX " engines and will have accommodation for twelve passengers and a crew of two. The air endurance will be 3½ hours at cruising speed and the range will be 300 sea miles.

Supermarine Single-Engined 8-*Seater Boat Seaplane.*

This seaplane has accommodation for seven passengers and one pilot, is fitted with an "Eagle IX" engine, has a speed of 85 miles an hour, a range of 255 miles and an air endurance of three hours.

(2) BAGHDAD—INDIA ROUTE,

for which a machine will be built having one or three engines to give a total of 1,000 H.P., with petrol capacity for 500 miles against a head wind of 30 miles an hour. The aircraft will have a speed of 95 miles an hour at 10,000 feet, and will carry a crew of two and eight passengers and their baggage, together with cooking apparatus and food for ten people.

(3) THE IMPERIAL ROUTE,

for which a machine will be built having three engines, each under 700 H.P., and petrol capacity for 1,300 miles against a head wind of 15 miles an hour. This aircraft will fly at 90 miles an hour at 10,000 feet and will carry a crew of four, passengers and goods. The passengers will be accommodated in comfortably upholstered seats in the main cabin in the body of the aircraft; collapsible removable tables will be provided for the use of passengers and the cabin will be well ventilated. An electric fan will be installed and electric light throughout. Tanks for drinking water and washing purposes will be installed. Complete arrangements for electric cooking will be made and every possible convenience provided.

As an indication of the trend of design in large passenger carrying aircraft, the following particulars of the Vickers "Vanguard" are given :—

This aircraft is fitted with two Napier "Lion" engines. It carries a crew of two and twenty-three passengers and luggage. It has a speed of 100 miles per hour and an air endurance of 4½ hours. The passengers' cabin is 6 ft. 6 ins. high internally and entirely free from internal cross bracing or other inconvenient obstructions. Collapsible tables are fitted for the use of passengers, and a gangway is provided the whole length of the cabin. Electric light and all necessary conveniences are provided. The cabin will be ventilated by an approved system which will provide a plentiful supply of warm or cold air as required. Windows are provided on each side of the cabin, which will ensure a comfortable view to each passenger, and of these windows at least four on each side are capable of being opened.

Aircraft engines and their accessories have been improved by investigating such matters as the limiting loadings for ball, roller and plain bearings and the stresses in crankshafts and other vital parts.

Engines using heavy oils by direct fuel injection are being developed and are giving promising results. It is hoped that this class of engine will eventually replace the petrol engine for aircraft, thus practically removing danger from fire.

The reliability of the turbo super-charging system has been improved. This device will enable the power of the engine and the speed of the aircraft to be sustained when flying at high altitudes.

For landing in fog an automatic landing device is being tested. An electric cable carrying alternating current is laid in the form of a track just beneath the surface of the ground. The aircraft carries a set of search coils and an instrument which, using the shape and strength of the magnetic field, acts as a steering and height indicator. During fog the aircraft is directed to the aerodrome either by directional wireless or other suitable means and when it is nearing the landing track the instrument comes into operation and enables the pilot to locate the track while in the air, and by watching the indications of height he is able to land although the ground is invisible.

Numerous tests on the following instruments for use on civil aircraft have been carried out with satisfactory results :—

(1) R.A.E. Turn Indicator.
(2) Reid Control Indicator.
(3) Prieur-Bonneau Gyro Inclinometer.
(4) Minus Blue Glass for mist piercing.
(5) Colour Filters for night flying work.

MEDICAL SERVICES.

Routine examinations every six months continue to be carried out of all civil pilots who desire to hold Class B. (Public Transport) licences. These examinations have many useful purposes; not only do they give information as to the actual condition of the pilot at the time of examination and as to whether he is fit to pursue the arduous work of piloting, but they also enable precise records to be accumulated, and from these it will ultimately be possible to estimate the effect of continuous flying on the lives of pilots. As the statistics increase, it becomes more and more evident that, if pilots maintain reasonable habits of regular exercise, and are also reasonable in their indulgence in alcohol and tobacco, flying is not one of those occupations that lead to an early breakdown in the health of the individual. Indeed, it is possible with increasing confidence to look forward to a long and useful flying life for the great majority of pilots who take up this work as a profession.

The importance of furthering and enlarging our knowledge of the physical requirements of the ideal pilot has not been lost sight of, and investigations are being actively carried out into the value of new methods for measuring auditory acuity, efficiency of the heart's action and other similar matters so important to the pilot. Special investigations are also being carried out with a view to improving the ventilation and heating of passenger cabins, and eliminating noise and vibration as far as possible. The preliminary results of these experiments are hopeful, but much yet requires to be done.

Finally, as a matter of interest to would-be passengers, it is satisfactory to be able to record that the great majority of the present civilian pilots have physical attributes above the normal.

THE DOMINIONS, INDIA AND THE COLONIES.

Australia.

The Commonwealth Government has decided upon the immediate establishment of six trunk air lines, two of which are already being operated with success.

Details of these lines are as follows :—

In Operation.

(i) *Geraldton–Derby.*—1,195 *miles.*

Operating company—Western Australian Airways, Ltd. Contract renewed for second year. Maximum subsidy, 25,000*l.* yearly in return for a weekly service. Regular operation commenced April, 1922, and has been maintained with 97 per cent. regularity. During the eight months ending December, 1922, 86,000 miles were flown and 70,000 letters were carried. Mail and passenger traffic is steadily increasing; the number of letters carried rose from 4,000 in April to 12,000 in November. The freight carried averages 600 lbs. per month. A great saving in time is accomplished by the air line, *e.g.*, the journey from Perth to Broome takes 11 days by coastal steamer and only two days if the air line is used from Geraldton. An extension of the line from Derby to Wyndham (300 miles) is under consideration.

(ii) *Charleville–Cloncurry.*—560 *miles.*

Operating company.—Queensland and Northern Territory Aerial Services, Ltd. Maximum subsidy, 12,000*l.* yearly in return for a weekly service. Regular operation commenced in November, 1922, and during this and the following month 10,000 miles were flown with 100 per cent. efficiency. This is a very valuable route which links up the inland terminals of railways running from the seaboard towns of Brisbane, Rockhampton and Townsville. By ordinary means of transport the journey takes as many days as the aeroplane takes hours.

About to commence Operation.

(iii) *Sydney–Adelaide.*—760 *miles, and*

(iv) *Sydney–Brisbane.*—550 *miles.*

Operating company—Larkin Aircraft Supply Co., Ltd. Annual subsidy :—Route (iii), 17,500*l.*; route (iv) 11,500*l.* for a weekly service. The routes are in readiness and the services will be commenced as soon as machines are received from England.

In Course of Organisation.

(v) *Melbourne–Hay*, linking with Sydney–Adelaide.

(vi) *Sydney–Charleville*, linking with Charleville–Cloncurry.

Apart from the six lines mentioned above, the Government is considering plans for the opening up of four additional routes, namely :—

Perth–Adelaide,
Adelaide–Port Lincoln,
Gladstone–Cairns, and
Melbourne–Tasmania.

It is hoped to make a preliminary survey of these routes during the present year.

The Australian Air Board has acquired sites for aerodromes in *all the capital cities* of Australia, except, at the moment, Perth.

The operating personnel of the air lines will be members of the R.A.A.F. Reserve.

Australia had at the end of 1922, approximately—

60 licensed pilots,
110 ground engineers,
50 registered civil aircraft,
52 licensed public aerodromes besides Government owned aerodromes and emergency landing grounds.

Canada.

All defence forces of the Dominion, including the Canadian Air Force, have been united under a Minister of Defence and the Air Board has therefore ceased to exist as a separate entity.

In connection with this change, a complete reorganisation of the Government air services has been carried out, under which the Civil Operations Branch, which was formerly conducted on a civil basis, has been united with the Canadian Air Force, and the joint service placed under a single Director who is responsible to the Chief of Staff in the Ministry of Defence. The general policy of the Air Board which aimed at employing the air units to the maximum benefits of the Dominion is, however, being continued.

A wide range of duties is carried out on repayment on behalf of other Government Departments and Provincial Governments. Among the duties undertaken during 1922 were :

Interior Department—Forestry Branch.—Continuation and extension of fire detection and prevention patrols in Columbia, Alberta, and Manitoba. Aerial photography for the survey of forest reserves and study of forest types. *Geodetic Survey.*—Transportation of survey parties. Reconnaissance flights and aerial photography. *Topographical Survey.*—Vertical and oblique photography and transportation in various districts, including the making of a complete aerial mosaic of a township in the Calgary district for comparison of the results with those of ground surveys. *National Parks Branch.*—Fire patrols and aerial photography. Assistance in connection with the protection of migratory birds along the north shore of the St. Lawrence and elsewhere, subject to other operations permitting. *Water Powers Branch.*—Photographic survey and photography of numerous watersheds, rivers, power sites, &c.

Department of Mines — Geological Survey. — Photographic reconnaissance and transportation of supplies to survey parties.

Department of Customs and Excise.—Continuation of patrols from Vancouver for the prevention of smuggling by incoming and outgoing vessels.

Department of Agriculture.—Transportation of field parties investigating white pine blister rust in the coastal regions of British Columbia.

International Joint Commission.—Vertical and oblique photography of streams crossing the international boundary in southern Alberta.

Department of Indian Affairs.—Transportation of treaty-money paying parties to various points.

Provincial Governments.—Forest fire patrols and survey work for the provincial Governments of British Columbia and Quebec. Forest fire patrols for the Provincial Government of Ontario.

An important feature in drawing up this programme was the increased demand of the Departments for aerial photography, especially in connection with the conservation of water supplies on the prairies. The branches concerned recognise that aerial photography can give them detailed information only obtainable otherwise by intensive ground work at considerable expense.

The work carried out by Canadian civil aviation companies has increased considerably. For example, in 1921 the total number of hours flown by commercial aircraft was 4,347, of which 760 hours, or about one-sixth, were on work, such as forest fire patrols, forest survey, aerial survey, transportation, &c. The corresponding figure for 1922 was 1,256 hours out of a total of 2,541 hours, or more than half. The numbers of square miles patrolled, surveyed, and photographed by commercial aircraft in 1922 were 19,678, 19,236, and 791 respectively. This work was carried out by three companies, two of which were operating under contract with the Ontario Government and several of the large pulp and paper companies, while the third, a lumber company, employed aircraft as a subsidiary to their main operations. During the season 76 forest fires were spotted by commercial machines and either put out by the crews themselves or reported to a base from which fire fighters were despatched. 185,211 miles were flown in commercial flying without a single fatal accident.

India.

Owing to lack of funds there has been little or no progress in civil aviation during the year under review.

The Air Board are considering the organisation of the Calcutta–Rangoon route and have requested funds for this route in their estimates for 1923–24. Upper-air investigations which have been carried out recently indicate that flying on this route is possible on all but about twenty days in the year.

A study has been made of the rate of deterioration of various types of aircraft under the extremes of moisture and dryness experienced at Calcutta.

It was found that built-up wooden parts suffered most damage, the glue being the principal source of trouble, while in light wooden parts, such as rib bracing and hollow struts, there were clear signs of shrinkage and weakening. The importance of proper housing was emphasised.

The problem of forest survey by aerial photography has been under consideration, and the Chief Inspector of Aircraft has submitted proposals for the survey by air of forests in the Irrawaddy Delta, Burma, the cost of which is estimated to be considerably lower than the cost of the same work if executed by a ground party.

Middle East.

Traffic on the Cairo-Baghdad air mail service, which is operated by the Royal Air Force, increased threefold during the course of 1922. The following figures illustrate the extent to which this service is being utilised :—

	Letters carried. Cairo-Baghdad. (*Total.*)	Letters carried. Baghdad-Cairo. (Letters for United Kingdom *only.*)
1st quarter - -	6,317	4,000 (estimated)
2nd quarter - -	11,347	20,800
3rd quarter - -	13,305	25,600
4th quarter - -	20,892	29,500
	51,861	79,900
	131,761	

A check on the proportion carried by air of the total first-class mail matter was made in October last, and the results showed that the correspondence carried by air amounted to 19 per cent. of the traffic outward and 28 per cent. of the traffic inward.

Throughout the year, the average number of days saved by the air mail was 17, varying between 14 days and 19 days.

Newfoundland.

The Aerial Survey Coy. (Newfoundland), Ltd., which operates on a purely commercial footing, has accomplished much valuable pioneering work with aircraft in connection with seal spotting, aerial survey and the carriage of mails. It has successfully maintained flying operations during the winter, when all other means of transport, with the exception of dog teams, are held up for periods of a month at a time.

The company has established eight bases, four in Newfoundland and four in Labrador, and as a result of observations made from the air when flying over the west of Newfoundland the directors of the company have secured the right of working certain timber limits at Hawkes Bay and have established a sister company, the Hawkes Bay Trading Coy., Ltd., for this purpose.

New Zealand.

At present three companies are in receipt of a subsidy, which is paid on a valuation scale according to the efficiency of personnel, aircraft, aerodromes, &c. In addition, work is found for the companies in giving refresher courses to service pilots. The following statistics illustrate the amount of flying carried out by these companies :—

	Passengers.	Hours flown.	Miles flown.
Year ending 31st March, 1922	9,382	1,006	69,039
Half-year ending 30th September, 1922 - - -	1,417	135	10,017

South Africa.

An Air Navigation Bill, to enable effect to be given to the International Air Convention and to provide for the regulation and encouragement of aviation, has been submitted to the Union Parliament. The second reading of the Bill was due to take place on March 5th, 1923.

TABLE A.

British Civil Aviation.

(May, 1919, to March, 1923, inclusive.)

Period.	Part I.				Part II.		
	Air Transport (Internal and Continental).				Other Flying.*		
	Machine Flights.	Machine Mileage.	Passengers carried.	Cargo carried.	Machine Flights.	Machine Mileage.	Passengers carried.
				(Tons.)		(Approx.)	
April, 1922 - - - - -	260	50,000	619	8·8	965	9,000	1,769
May ,, - - - - -	428	86,000	898	21·9	1,319	11,000	2,409
June ,, - - - - -	422	88,000	890	21·9	2,246	19,000	3,895
July ,, - - - - -	467	96,000	1,272	37·5	2,092	19,000	3,894
August ,, - - - - -	643	124,000	2,286	43·8	2,642	22,000	6,010
September ,, - - - - -	478	92,000	1,449	34·6	955	6,000	1,762
October ,, - - - - -	329	60,000	1,216	20·6	1,342	9,000	2,290
November ,, - - - - -	177	33,000	552	7·8	648	4,000	1,062
December ,, - - - - -	184	35,000	535	7·0	514	3,000	782
January, 1923 - - - - -	175	34,000	426	3·0	255	2,000	793
February ,, - - - - -	148	24,000	404	4·0	254	2,000	400
March ,, - - - - -	289	56,000	913	5·5	346	3,000	601
Total, year ending **31**st March, 1923 -	4,000	778,000	11,460	216·4	13,578	109,000	25,253†
Total, year ending—							
31st March, 1922 - - - - -	1,156	259,000	5,692	26·6	21,767	234,000	36,048
31st March, 1921 - - - - -	2,641	599,000	5,754	124·5	23,513	302,000	36,694
§31st March, 1920 - - - - -	754	168,000	1,155	46·0	37,067	524,000	66,785
Total : May, 1919, to March, 1923 -	8,551	1,804,000	24,061	413·5	95,925	1,169,000	164,780

* In Part II of this table the figures relating to period April, 1922, to March, 1923, refer to flights for hire or reward other than air transport flights; and thus consist almost entirely of joy riding. The figures for the previous three independent periods include all flying other than regular air transport. Based on returns for 1922, about 91 per cent. of the flying shown in Part II previous to April, 1922, would have been flying for hire or reward.

† Paying passengers only.

§ Air Transport (Part I) commenced in August, 1919, and Other Flying (Part II) in May, 1919.

TABLE B.

AIRCRAFT FLIGHTS AND PASSENGERS CARRIED BETWEEN GREAT BRITAIN AND THE CONTINENT.

(August, 1919, to March, 1923, inclusive.)

Period.	Nationality of Aircraft.											
	British.		French.		Belgian.		Dutch.		Others.		Total.	
	Flights.	Passengers carried.	Flights.	Passengers carried.	Flights.	Passengers carried.	Flights.	Passengers carried.	Flights.	Passengers carried.	Flights.	Passengers carried.
April, 1922	213	614	115	164	—	—	24	18	—	—	352	796
May ,,	372	898	170	255	—	—	74	43	—	—	616	1,196
June ,,	330	890	143	171	—	—	91	75	—	—	564	1,136
July ,,	446	1,272	169	251	—	—	96	68	—	—	711	1,591
August ,,	598	2,203	210	339	—	—	104	140	—	—	912	2,682
September ,,	339	1,364	176	307	2	1	55	51	—	—	572	1,723
October ,,	176	896	154	364	—	—	52	64	—	—	382	1,324
November ,,	91	344	56	72	—	—	41	40	—	—	188	456
December ,,	89	333	62	81	—	—	41	60	—	—	192	474
January, 1923	89	293	72	56	—	—	34	37	3	3	198	389
February ,,	74	281	49	64	—	—	21	16	—	—	144	361
March ,,	148	678	110	299	—	—	48	67	—	—	306	1,044
Total, year ending 31st March, 1923	2,965	10,066	1,486	2,423	2	1	681	679	3	3	5,137	13,172
Total, year ending—												
31st March, 1922	1,156	5,692	1,575	4,258	342	597	368	483	53	12	3,494	11,042
31st March, 1921	2,641	5,754	786	837	176	128	3	—	4	1	3,610	6,720
31st March, 1920 (7 months)	754	1,155	133	97	7	3	—	—	2	—	896	1,255
Total: August, 1919, to March, 1923	7,516	22,667	3,980	7,615	527	729	1,052	1,162	62	16	13,137	32,189

TABLE C.

VALUE OF GOODS (*a*) IMPORTED INTO THE UNITED KINGDOM BY AIRCRAFT; (*b*) EXPORTED AND RE-EXPORTED FROM THE UNITED KINGDOM BY AIRCRAFT.

(August, 1919, to March, 1923, inclusive.)

Period.	Imports from					Exports and re-exports to				
	Belgium.	France.	Nether-lands.	Other Countries.	Total.	Belgium.	France.	Nether-lands.	Other Countries.	Total.
	£	£	£	£	£	£	£	£	£	£
April, 1922	—	20,741	613	—	21,354	103	17,414	771	54	18,342
May ,,	166	44,305	2,362	—	46,833	206	24,625	1,260	1	26,092
June ,,	641	42,997	4,190	500	48,328	445	18,328	3,067	176	22,016
July ,,	813	42,197	4,615	—	47,625	1,178	24,897	2,825	117	29,017
August ,,	476	32,642	3,120	114	36,352	1,481	23,459	4,073	239	29,252
September ,,	127	57,048	3,727	681	61,583	1,040	24,583	2,480	154	28,257
October ,,	1,007	50,728	10,969	194	62,898	2,151	30,638	5,733	72	38,594
November ,,	152	42,207	3,914	1,893	48,166	721	17,481	5,995	15	24,212
December ,,	115	32,452	2,076	271	34,914	341	8,264	1,670	9	10,284
January, 1923	4	22,271	4,928	3	27,206	72	15,393	1,640	292	17,397
February ,,	150	19,289	2,281	2	21,722	97	10,332	1,047	37	11,513
March ,,	—	38,611	2,311	219	41,141	2	9,730	812	152	10,696
Total, year ending 31st March, 1923	3,651	445,488	45,106	3,877	498,122	7,837	225,144	31,373	1,318	265,672
Total, year ending—										
31st March, 1922	4,583	325,417	8,471	560	339,031	3,535	178,759	19,741	948	202,983
31st March, 1921	4,453	665,089	2,178	10,579	682,399	26,570	260,954	44,210	4,297	336,031
31st March, 1920 (seven months)	391	135,248	471	6	136,116	9,583	57,161	—	1	66,745
Total: August, 1919 to March, 1923	13,078	1,571,242	56,226	15,022	1,655,668	47,525	722,018	95,324	6,564	871,431

TABLE D.

Efficiency of British Air Transport Services.

Part I.—On London–Paris Route from January, 1920, to September, 1922.
Part II.—On all subsidised Routes—October, 1922, to March, 1923.

Part I.

Period.	Flights.						Percentage to Total Flights Commenced of (Flights completed within 4 Hours.*	*Notes.*
	Completed same Day in			Time taken not known.	Not completed same Day.	Total com-menced.		
	Under 3 Hours.	3 to 4 Hours.	Over 4 Hours.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
January to September, 1920	1,055	268	79	164	94	1,660	85	1. The subsidy time for this route is four hours. 2. * Assumes that one-half only of the Flights in column (5) were completed in less than four hours. 3. Figures for 1919 not available.
October, 1920, to September, 1921	711	241	36	14	70	1,072	89	
October, 1921, to September, 1922	1,723	247	50	3	129	2,152	92	

Part II.

Period.	Flights.†				Percentage of Total Flights commenced which were completed in Subsidy Time.
	Completed to Terminal Aerodrome		Not completed same Day.	Total Commenced.	
	Within Subsidy Time.	Same day, but in more tha Subsidy Time.			
October, 1922	147	5	15	167	86
November ,,	93	9	19	121	77
December ,,	105	7	16	128	82
January, 1923	109	4	19	132	83
February ,,	72	3	18	93	77
March ,,	146	2	19	167	87
Total: October, 1922, to March, 1923	672	30	106	808	83

† The flights in Part II. were flights commenced on scheduled services only. Terminal aerodromes were Manchester, London, Paris, Amsterdam and Cologne.

TABLE E.

CAUSES OF LANDINGS *en Route* FOR OTHER THAN TRAFFIC REQUIREMENTS, IN RESPECT OF FLIGHTS BY SUBSIDISED FIRMS DURING NINE MONTHS—JULY, 1922 TO MARCH, 1923.

Total Flights Commenced.	Cause of Stoppage.	No. of Stoppages.	Percentage of Total Stoppages.	Percentage of Total Flights Commenced Interrupted.
2,090	Weather - - - - - - - - - -	140	44·7	6·7
	Petrol or Oil Shortage - - - - - - -	115	36·6	5·5
	Engine or Installation Failure - - - - - -	40	12·7	1·9
	Other reasons - - - - - - - - -	19	6·0	0·9
2,090	——	314	100·0	15·0

N.B.—In many cases, the stoppage for petrol was pre-arranged. Also, many other of the flights interrupted through one of the above causes were completed after a short delay. For full particulars of efficiency *see* Table D.

TABLE F.

ACCIDENTS: CIVIL AVIATION.
(May, 1919, to March, 1923, inclusive.)

—	May, 1919, to March, 1920.		April, 1920, to March, 1921.		April, 1921, to March, 1922.		April, 1922, to March, 1923.	
	Air Transport.	Other Flying.	Air Transport.	Other Flying.	Air Transport.	Other Flying.	Air Transport.	Other Flying.
Passengers killed	1	—	2	7	No Accidents	1	—	3
Passengers injured	2	9	2	1	,,	2	1	7
Passenger flights per passenger killed	1,155	—	2,877	5,242	,,	37,408	—	9,049
Passenger flights per passenger injured	580	7,420	2,877	36,694	,,	18,704	11,460	3,878
Crew killed	2	2	2	3	,,	2	2	4
Crew injured	1	9	—	6	,,	4	1	2
No. of accidents involving casualties:—								
Fatal	2	2	1	3	,,	2	1	3
Non-fatal, but resulting in injury to occupants	—	11	1	6	,,	4	1	3
Approximate machine miles per accident resulting in death or injury to occupants	84,000	40,000	299,000	34,000	,,	39,000	389,000	23,000
Machine flights per accident resulting in death or injury to occupants	377	2,851	1,320	2,612	,,	3,628	2,000	2,478

N.B.—The numbers of crew carried are not available.

"Other Flying" includes flying not for hire or reward, but excludes competition flying. No paying passengers were involved in the accidents referred to under this heading for the period April 1922—March 1923.

PART II.—FOREIGN COUNTRIES.

GENERAL REMARKS.

The year under review witnessed a gradual lessening of activities on short air routes and concentration on long, international lines. Thus, the French lines Paris–Havre, Paris–Marseilles, Paris–Geneva and Geneva–Lyons will no longer operate while the France–North Africa group of lines is being extended and the Paris–(Warsaw)–Constantinople service will be intensified. Germany's efforts to extend her air lines are directed principally towards Russia. Already an air line is running regularly between Konigsberg and Moscow, and plans for a line extending from Germany to Petrograd and another connecting Moscow with Persia and Sweden are in contemplation.

The trend of development emphasises the need of close international co-operation in the sphere of air transport and illustrates the important rôle to be filled by the International Commission for Air Navigation and the International Air Traffic Association respectively. The former body has, in the short period since its formation, given clear proof of the advantages gained by co-operation between Governments in solving problems affecting administration and ground organisation, while the latter body, now in its fourth year of existence, provides a channel through which co-operation in commercial matters is arranged by the operating companies. Membership of the I.A.T.A. is open to all air transport companies and includes Belgian, British, French, Danish, German, Netherlands, Norwegian and Swedish companies.

The Association met at Copenhagen in July–August, 1922, and at Wiesbaden in January, 1923. It is in touch with the Advisory and Technical Committee for Communications and Transport under the League of Nations and with the International Postal Union, and hopes to arrange co-operation with the International Railway Union in order that connections may be established between railways and air lines.

EUROPE.

BELGIUM.

The Belgian air lines have been suspended since May, 1922, but plans for an early resumption on a more permanent basis are nearing completion.

The Belgian Government has given favourable consideration to a proposal for the foundation of a national air transport company in which the State would be a partner. This Company, entitled the Société Anonyme Belge d'Exploitation de la Navigation Aérienne (SABENA), would receive a monopoly of air transport in Belgium and for at least five years would be guaranteed against loss by the Belgian Government, up to the following limits :—

1923 - - - - - -	2,400,000 frs.
1924–1927 - - -	3,100,000 frs. per annum.

In addition, the company would receive a subsidy from the Government of the Belgian Congo up to 1,500,000 frs. per annum for the operation of the Kinshasa–Stanleyville air line.

Upon the formation of this new company, the old Belgian company, the Société Nationale pour l'Etude des Transports Aériens, would be dissolved.

A national aircraft construction company has been established under a guarantee from the Government of orders to the value of 6 million francs per annum for the next five years.

FRANCE.

The plans of the French Government for creating a great air industry have been carried a stage further during the year under review. The organisation of the Paris–Constantinople air line has been completed and the route is in readiness for regular daily operation. This line, together with the branch from Prague to Warsaw, opens up rapid communication between Paris and the following countries : Czecho-Slovakia, Roumania, Poland, Yugo-Slavia, Austria, Hungary, and Turkey.

A daily service is now run between Toulouse and Casablanca, connecting France with her N.W. African colonies, and the carriage of mails by this line is increasing at a remarkable rate, as the following figures show :—

1919 No. of letters - - - - -	39,124
1920 ,, ,, - - - - -	182,061
1921 ,, ,, - - - - -	327,805
1922 ,, ,, - - - - -	1,407,352

In October, 1922, an extension of this line was opened from Casablanca to Fez and Oran. The French Government appears to attach great importance to air transport as a means of colonising and developing the French colonies and has decided upon a programme including—

(i) Two new lines between France and N. Africa, viz., Marseilles–Algiers and Antibes–Tunis (by seaplane).

(ii) An extension of the Toulouse–Casablanca line to Dakar (Senegal), where it will connect with the existing line to Kayes and Bamako. It is hoped eventually to extend this line from Dakar to South America.

(iii) A line in Madagascar, between Tullear and Antsirabe.

The financial provision for civil aviation and allied services amounted to about 147,000,000 francs in each of the years 1921 and 1922. A slight increase—to about 150,000,000 francs—is proposed for 1923. The sum allocated to subsidies for air transport has shown a progressive increase year by year from 31,700,000 francs in 1921, 45,382,000 in 1922, to about 50,000,000 (not finally settled) in 1923.

The grant in 1923 for the Service Technique (S.T.Aé) of the Under Secretariat for Aeronautics, covering research and experiment for both Service and Civil aviation, is to be considerably increased. In the past, approximately equal amounts have been voted for the Service Technique (S.T.Aé) and the Service de la Navigation Aérienne (S.N.Aé), respectively. Up to the date of this report the votes had not been finally fixed, but in the form passed by the Chamber of Deputies the vote for the S.T.Aé. amounted to about 60,000,000 francs and for the S.N. Aé to about 28,000,000 francs.

The following statistics show a comparison between the work done by the French air transport companies in 1921 and 1922 respectively :—

	1921.	1922.
Flights or stages	6,513	7,184
Passengers carried	10,305	6,722
Goods carried, tons	175	357
Mails carried, tons		39·8
Miles flown, estimated	1,460,000	2,015,000

Thus, it will be seen that the passenger traffic fell off in 1922, but that goods and mail traffic was nearly double that in the previous year.

An important step to encourage the insurance of aircraft at low rates was taken in October last, when the French Government decided to transfer the duties of inspecting aircraft to the "Bureau Veritas," a large insurance organisation.

The functions of this body in regard to inspection will be similar to those of British ground engineers and, in effect, the certificate of airworthiness for an aircraft will only be valid so long as the machine is certified as airworthy by the inspectors of the "Bureau Veritas." The Bureau will receive a Government subsidy as remuneration for this service, the sum proposed for 1923 being 300,000 francs.

Eight centres for the training of reserve pilots are in operation under civil management and up to the end of 1922 1,250 pilots had received training. Any ex-service pilot is entitled to carry out 12 hours of flying annually, and the cost of the scheme to the State is about 3,000,000 francs per annum. It is understood that the scope of these centres will be extended to include the completion of training of men who were undergoing a flying course at the time of the Armistice and were demobilised before qualifying as pilots.

GERMANY.

A large air transport combine, the *Aero Lloyd A.G.*, has been recently created in Germany by the amalgamation of the *Aero Union A.G.* (owners of the Deutsche Luftreederei) and the *Lloyd-Luftdienst, G.m.b.h.* The combine embraces the two leading German shipping companies, an important engineering company and several aircraft constructors.

The Chairman of the new company is an ex-Minister, Herr von Raumer, while the Vice-Chairman is Herr Ritter, Chairman of the Hamburg–America Line. The capital is 100,000,000 mks.

On the one side, that of the Aero Union A.G., the firms concerned are :—

Allgemeine Elektrizitäts Gesellschaft (A.E.G.).
Hamburg-America Line (HAPAG).
Zeppelin Luftschiffbau, G.m.b.h.
Sablatnig Flugzeugbau, G.m.b.h.
Deutsche–Russische Luftverkehrs G.m.b.h. (half the shares of which are owned by the Soviet Government).

On the side of the Lloyd Luft-dienst, there is the Nord Deutsche Lloyd and the following subsidiary companies :—

Lloyd Ostflug, G.m.b.h. (including Albatros, G.m.b.h. and Ostdeutsche Landeswerke-statten).
Lloyd-Luftverkehrs, G.m.b.h.
Austro Lloyd Luft-dienst, G.m.b.h. (sister company in Austria).

The Junkers Flugzeugwerke, A.G., which was formerly associated with the Lloyd Luft-dienst, G.m.b.h. in a company called the Lloyd-Junkers Luftverkehrs, G.m.b.h., is not included in the combine.

The German Government has provided money in increasing amounts for subsidising air transport. The sums voted during the past three years were : 11 million marks in 1920 ; 26 million marks in 1921, and 45 million marks in 1922.

During the summer of 1922, Germany had in operation altogether 15 air routes, with a total length of about 3,980 miles and her machines were reported to have covered 750,200 miles. The principal achievement in German aviation was the opening of an air line between Konigsberg and Moscow (780 miles), which reduced the journey time between Berlin and Moscow from about 5 days to 22 hours. The machines used for this line are of Fokker limousine type, fitted with British Rolls Royce "Eagle VIII." engines. The operating company, the Deutsche-Russische Luftverkehrs Gesellschaft (German Russian Air Transport Company) is guaranteed as to profits by the Soviet Government.

During 1922 the operating companies were compelled, owing to variation in the value of the mark, to increase their rates and fares by approximately 300 per cent.

A successful seaplane service is operated by Germans in Colombia along the river Magdalena and efforts are being made to establish services in other Central and South American States. Two German seaplanes recently flew from Havana (Cuba) to La Guaira, Venzuela, *viâ* Santo Domingo and Port au Prince (Haiti). The entire journey, about 1,450 miles, was covered in 19 hours actual flying time. From Venezuela these machines will probably proceed to Brazil.

HOLLAND.

The Government subsidy to the Koninklijke Luchtvaart Maatschappij (K.L.M.) has been considerably increased from time to time. Originally the Government agreed to pay 200,000 florins for the combined years 1920 and 1921, and the same amount per annum thereafter, this representing two-thirds of the Company's estimated losses. Experience proved that a larger subsidy was required to support the Company's activities and in 1922 the Government, recognising the importance to Holland of maintaining its place in the European air line system, increased the grants nearly twofold, *i.e.*,

For 1920 - - - - - -	120,000 florins.
,, 1921 - - - - - -	300,000 ,,
,, 1922 - - - - - -	325,000 ,,

A further increase has been approved for 1923, raising the amount this year to 400,000 florins.

The K.L.M. services between Amsterdam and London and Amsterdam and Brussels have been characterised by remarkable regularity, and the Company claims to have flown over one million kilometres without accident.

ITALY.

The Italian Air Services, which, since the War, had fallen into a state of neglect, are being reorganised.

Responsibility for all Government aviation services has been placed under a High Commissioner of Aeronautics, which post is being filled for the time being by Signor Mussolini himself. Two directorates have been formed, one for the administration of civil aviation and the other for the co-ordination and administrative control of the Air units working with the Army and Navy. Formerly, the control of civil as well as of military aviation was exercised by the Ministry of War and of naval aviation by the Ministry of Marine.

A programme for the encouragement of civil aviation has been decided upon, and it is expected that a start will soon be made on the organisation of commercial air lines. Italy, no doubt recognising the advantages of her position on the mail route to the East, is giving attention to the possibility of an air link between Brindisi and Egypt.

The development of airships is being resumed with a view to the establishment of a commercial airship service.

SPAIN.

Several concessions for air lines have been granted during the year, but only two lines have been operated, namely, an aeroplane service, Seville–Larache (Morocco), and a seaplane service, Barcelona–Palma de Mallorca.

The Seville–Larache service is flown by British pilots with British machines and has completed its first year of operation with considerable success. The following figures illustrate the work done :—

Number of return journeys	345
Mileage	16,450
Flying hours	1,466
Passengers carried	552
Goods carried, lbs.	2,142
Mail bags carried, No.	1,035

Up to the present the Barcelona–Palma line has failed to operate regularly owing to a series of setbacks, but a French company, the Cie. Général d'Entreprises Aéronautiques (Latecoere) has recently entered into an agreement with the Spanish operating company, whereby the line will be re-equipped with French seaplanes in place of the Italian machines used in the past.

Commandante Herrera's scheme for an airship line between Spain and South America is progressing. A company has been formed under a guarantee from the Spanish Government as to interest on capital.

SCANDINAVIAN STATES.

Denmark.

An air agreement between Denmark and Sweden, similar to that between Denmark and Norway, was concluded on 7th November, 1922. These agreements are based on the "Scandinavian Air Convention," which it was intended should take effect concurrently in Denmark, Norway, Sweden and Finland, but which was abandoned in favour of separate agreements.

A Danish air service is to commence this spring, probably on April 15th, between Hamburg and Copenhagen. The operating company, the Dansk Luftfartselskab, had hoped to open this route in 1922, but was compelled to postpone the service until suitable connections were established between Hamburg and points further west. The present intention is to arrange a service that will connect at Hamburg with trains to Cologne and there link up with the Instone Air Service to Brussels and London.

Sweden.

In order to safeguard Sweden's position in the development of international air lines, a group of influential persons interested in aviation at the end of 1922 formed a company for the promotion of air transport on a national basis.

The first object of the company is to establish an air line between Malmo and Hamburg to connect with the Continental trains and air routes. This route would have great advantages for Sweden in expediting mails to and from Western Europe, and the Swedish Government has expressed its willingness to grant a subsidy of 600 kroner (33*l.* at par) for each return flight.

Mails sent by the night trains from Stockholm and Gothenburg to Malmo could be delivered in Hamburg next morning, in Berlin about noon, and in London the same evening, thus saving about 24 hours in conveyance to Berlin and about 48 hours to more distant places, such as London. A similar gain would result in the opposite direction, the machine being timed to connect at Malmo with the morning trains to Stockholm and Gothenburg.

The scheme has attracted much attention in Norway, where a Committee has been appointed to deal with the question. Norwegian mails from Christiania would benefit equally with Swedish mails.

EAST EUROPEAN STATES.

Poland and Esthonia alone among East European countries possess an air line operated by a native air transport company.

In Poland, the Polski Aero Lloyd carries on a regular service between Dantzig, Warsaw and Lemberg, while the Esthonian National Air Transport Company, the " Aeronaut," runs a service between Reval and Riga (Latvia).

AMERICA.

SOUTH AMERICAN STATES.

Argentina.

An agreement for the regulation of air navigation has been signed between Argentina and Uruguay, and arrangements have been concluded for an air mail service berween Buenos Aires and Montevidio.

The contract for carrying out this service has been granted to the River Plate Aviation Company, under Major Kingsley (ex-R.A.F.), who has purchased a fleet of seaplanes in England for the purpose. This company had previously operated with aeroplanes over the same route during the summer months.

With seaplanes the road journey between the aerodrome and the town at each end of the line is avoided, and the entire journey is done in 1½ hours instead of about 2½ hours as with aeroplanes.

The Ministry of War has submitted to the Government a scheme for the establishment of a network of air routes covering the principal towns of the Republic, but up to the present no decision has been made in the matter.

Brazil.

A sum of 4,000,000 milreis (approx. 260,000*l.* at par) has been voted to cover the cost of the Government's scheme for the establishment of two semi-civil air routes between the cities of Rio de Janeiro and Porto Alegre, one an overland route for aeroplanes and the other a seaplane route along the coast. Although the routes are intended primarily for use by the Military and Naval Air Forces respectively, the facilities they afford will be available for civil purposes subject to the approval of the Government being obtained and the payment of fees.

A French propaganda mission, composed of the well-known pilots Fonck, de Fronval and Loubet, visited Brazil during the Centenary Celebrations in the autumn of 1922. Exhibition flying and lectures were given in Brazil, Argentine and Uruguay.

Chile.

A pilot of the Chilean Military Air Service, Captain Aracena, in August last carried out a notable flight from Santiago to a point near Rio de Janeiro, crossing the Andes and covering a distance of about 1,800 miles. His machine was a British D.H.9a and he was accompanied by a British mechanic. Both the Military and Naval Air Forces of Chile are organised on British lines and use British material.

Colombia.

The first year's working of the air lines operated by the Colombo-German Air Transport Company up to 30th June, 1922, showed excellent results. The following figures are given :—

Distance flown, miles - - - - -	114,400
Hours flown - - - - - - -	1,340
Mails carried, lbs. - - - - - -	7,445
Valuables carried, lbs. - - - - -	5,353
Passengers carried - - - - - -	800

The gain of time effected by the air mail service on letters despatched between Barranquilla and Bogota, the capital, is 9 to 11 days.

Peru.

A Peruvian company, the Cia. National Aeronautica, has applied to the Government for a contract for running air services between the principal seaports and to towns in the interior. It is understood that the Government is prepared to adopt the company's plan.

U.S.A.

The Wadsworth Bill, for the establishment of a Bureau of Civil Aeronautics, has been held up pending discussion of the question of consolidating all aeronautical activities of the Government in a single department.

The Post Office Air Mail Service has continued to function regularly over the trans-continental route from New York to San Francisco. The results of this service for the year ending 30th June, 1922, as compared with the previous year, were as follows :—

	1921.	1922.
Miles flown - - - -	1,770,650	1,729,310
No. of pieces of Mail carried -	44,834,080	48,980,480

Experiments are in train in connection with a proposed night flying service, since the full value of the trans-continental air mail route cannot be realised until machines are able to fly continuously, by night as well as by day.

Three air lines have been operated on a commercial basis, viz. :—

Key West–Havana	Aeromarine Air Transport Coy.
Cleveland–Detroit	
Seattle–Victoria B.C. -	Hubbard Air Transport Coy.

In January, 1922, a corporation, named the General Air Service, was formed for undertaking the development of commercial airship services. Strong financial backing was obtained from among the leading bankers and business men, and the corporation has set to work on a thorough investigation of technical and commercial problems prior to deciding upon the construction of airships and bases. The president of the corporation is Mr. Benedict Crowell, a former U.S. Assistant Secretary for War.

ASIA.

SIAM.

A national fund has been opened for the development of aviation and has been well supported. The money raised is devoted to the equipment of the Siamese National Air Service, which combines civil work of utility with its military duties. An air mail line has been operated since June, 1922, between Korat, Roi-Et and Ubon and has given good results. During the four months July–October the traffic was as follows :—

	July.	August.	September.	October.
Letters (No.) - -	5,544	8,559	6,341	7,141
Newspapers (No.) -	3,926	5,175	4,325	6,240
Parcels (No.) - -	5	86	253	326
Total Weight (lbs.)	1,286	2,083	2,153	2,699

Vaccines, medicines and surgical apparatus are carried over this route free of air mail surcharge in order to assist the combating of epidemics.

With the same object in view machines may be hired from the National Air Service at reduced rates for rapidly conveying doctors and medicines to disease-stricken areas which cannot be reached in good time by ordinary means of travel.

Printed under the authority of His Majesty's Stationery Office
By Eyre and Spottiswoode, Ltd., East Harding Street, E.C. 4,
Printers to the King's most Excellent Majesty.